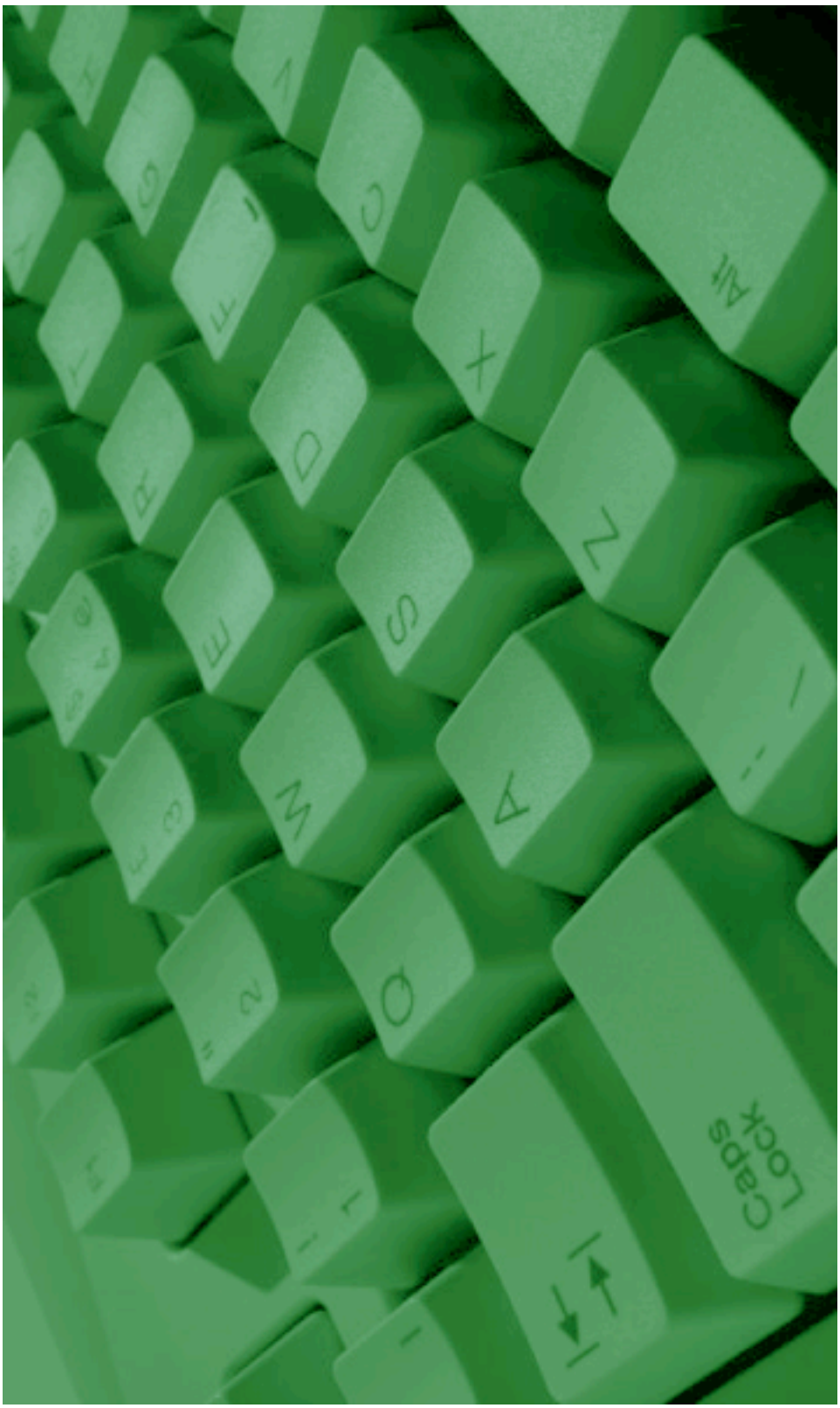

Digital Reflections on Learning

A monograph by students of Digital Pedagogies, Semester 2, 2011

Introduction

Learning a digital tool is often a hidden process. We tend to learn new tools in a bewildering range of ways. Formal, informal, structured, random, conscious, unconscious, individual, group strategies, may all play a part, but are often lost to us in the complex and demanding processes of learning. But when we reflect carefully on the experience, some patterns and surprising techniques emerge. This monograph presents the thinking of four students in MDN642, Digital Pedagogies, where they have deliberately reflected on the mental processes at work as they learnt a digital technology of their choice.

Michael Ryan, November, 2011.

Contents

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Livescribe: Linking the Familiar to the New.

Purpose

The purpose of this critical reflection is to examine the process undertaken to learn and apply new skills to a new technology. The selected technology for the focus of this reflection is the Livescribe or Smart Pen.

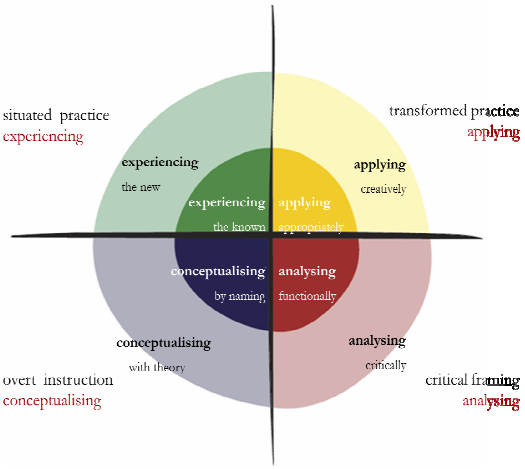
Given my role as a school administrator I find a good deal of my time is spent in meetings with students, parents and colleagues. Within each of these contexts I find it necessary to record notes of meetings, decisions made, flowcharts, diagrams and collaborative work. Whilst I have found it useful to use wikis and blogs to generate discussion and record thinking, I also acknowledge that I am extraverted in the way I generate energy.

Essentially "I like getting my energy from active involvement in events and having a lot of different activities." (Myers Briggs, 2011). As a result, I find the digital world of wikis and blogs useful but not as energising as tapping into the enthusiasm of others. My hope was that this pen would allow me to work freely, face to face, recording manually then transcribe to a digital format including voice recordings that could be uploaded and shared with others or transferred through my iTunes account to my iPad.

As I commenced, I had a need to anchor myself initially to what I believed learning was. When considering learning, Valsoner and Voss state: "There is wide acceptance of learning (as a process) to represent a basic factor in cultural transmission of values, skills, beliefs, or knowledge." (Valsoner & Voss, 1996, p. 331) It is also recognised that learning does not occur in isolation and essentially is a process of co-construction. "The learner and his or her co-learner, or the learner and the learning environment are synergistically linked." (Valsoner & Voss, 1996, p. 332) Having considered this I saw that there was a high degree of congruence between this view of learning and my own. I felt comfortable to proceed.

To assist with this reflection I have chosen a known 21st Century Framework. This conceptual framework is based on the four knowledge processes of Experiencing, Conceptualising, Analysing and Applying and is known as "Learning by Design" (Kalantzis and Cope, 2005).

I have used it as a heuristic to reflect on my actions, reasoning and reactions in relation to my learning.



Learning by Design Model
(Kalantzis and Cope, 2005)

Experiencing the Known

I commenced the learning process by examining what I thought I already knew about the technology from the packaging and discussions with others. I then made some links with the knowledge and skills possessed that I believed would assist me in learning a new system. Essentially what prior learning did I bring to this learning context that would support my success? Littlejohn, A. Falconer, I. Mcgill, L. (2006, p.758) state,

> Learning resources are fundamental to good quality education; print based resources are well established as an integral part of teaching across all sectors of education and their use has evolved over a long period of time, especially in conventional, didactic modes of teaching. However, the last few decades have seen major changes, both in ideas about effective teaching methods, and in the availability and affordances of new types of resources based on digital technologies. Understanding of how to employ these new resources is still evolving and teaching staff are in the position of learners as they explore effective ways of using them.

In examining what I believed I knew, understood or was familiar with I considered the following:

- designing and working with traditional handwritten texts;
- the hardware;
- the relevant USB connections, docking stations and operating systems;
- down loading and uploading;
- the transcribing functions of PDA's and iPad;
- making digital voice recordings and
- synchronizing various devices.

Experiencing the New

In deciding on a learning approach to experience the new, I considered my preferred learning style and what would best support me. I also considered the experiences, systems, technologies, mentors and supports I could access to assist me in the learning process. Given the work of Waeschauer (2007), who noted that to develop new digital literacies we needed to consider our traditional literacies as a foundation upon which to build, the achievement of autonomy through scaffolding and mentoring and the instrumental approach to technology. I realise that I designed a learning pathway that acknowledged these elements. The most significant of these include the following:

- My son agreed to assist me in problem solving given that he has used this device for personal tutoring and he could assist me in making the links between traditional and digital literacies.
- Instructions included in the packaging and on the Livescribe, Smart Pen paper and book required for the pen to operate.
- A colleague agreed to mentor me in my work environment given that she uses this device for personal notes.
- Podcasts and support from the Livescribe site http://www.livescribe.com/au/index.html
- Pen Casts http://www.livescribe.com/cgi-bin/WebObjects/LDApp.woa/wa/CommunityOverviewPage

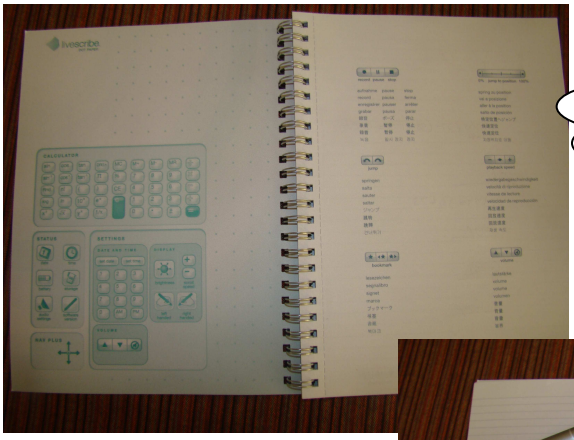
Interestingly I resorted to the manuals and online instructions only when I felt the technology had beaten me. Essentially, whilst I believed manuals and instructions were essential in practice I saw myself as a failure if I could not problem solve to arrive at a solution through exploration and discovery learning. Perhaps this is related to where I subconsciously position myself in a stereotypical socio cultural sense or perhaps it is related to my preferred learning style. However, it

must be noted that “relatively little research has investigated whether stereotype threat can undermine the acquisition of academic knowledge.” (Taylor & Walton, 2011, p.1056)

Conceptualising by Naming

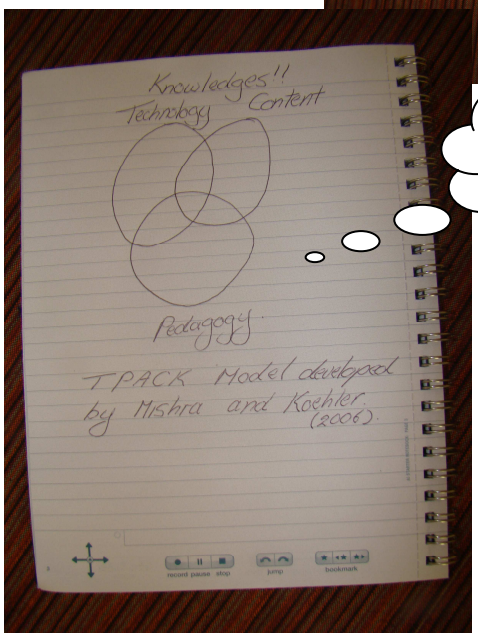
When conceptualising I initially examined what I believed would represent new conceptual knowledge. My intention was to develop an understanding and knowledge of:

- the commands menu;
- the pen’s interaction with the smart pen paper;
- meanings associated with icons;
- short cuts to achieve efficient usage;
- recording and playback functions;
- transcribing analogue to digital text ;
- uploading to iTunes and syncing with my iPad and
- Information sharing on the Livescribe site and with colleagues.



The “how to”, included in the front of each book of smart pen paper.

The essentials for use.



Using the Smart Pen paper.

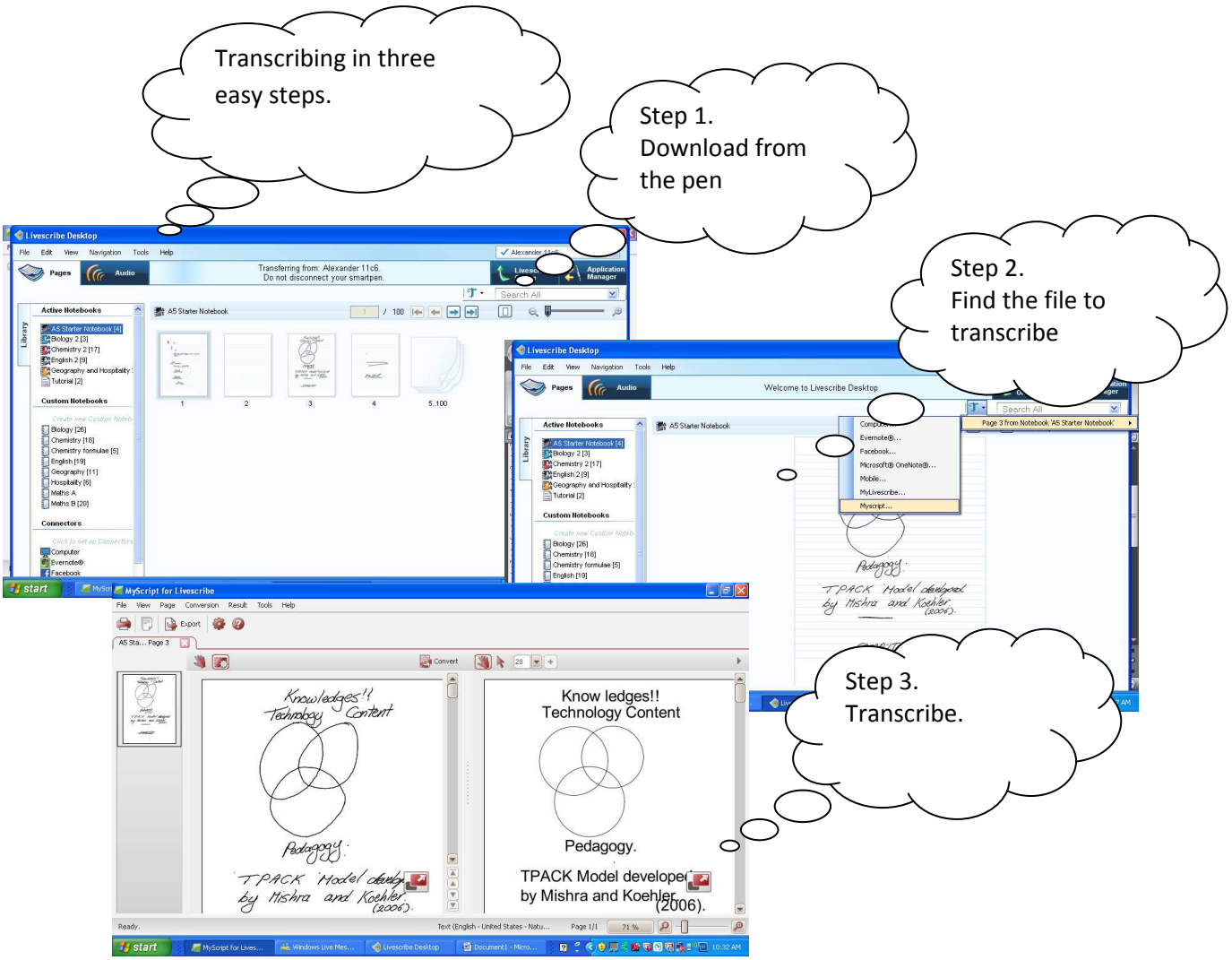
The technology tells me what to do.

It was at this stage that I commenced playing with the technology, exploring what I could do and achieve. Interestingly, when calling on my son to assist, he took on the role with enthusiasm but it resulted in frustration for both of us. Whilst he was keen to assist, he really wanted to show me. I didn't want to be shown but do it myself as he guided. He found this frustrating as I could not connect my knowledge and understanding with his. Finally he plugged the headphones into the device and activated the internal tutor that instructed me as I used the pen. This systems approach to instructional design (Carroll, 1990) was very useful.

I was able to make linkages between my prior learning, learn the basics and then identify specific questions to develop a deeper knowledge. I started to become aware of my limits and what I needed if I were to achieve my goals. I was becoming aware of the interaction between my purpose and required actions.

Conceptualising with Theory

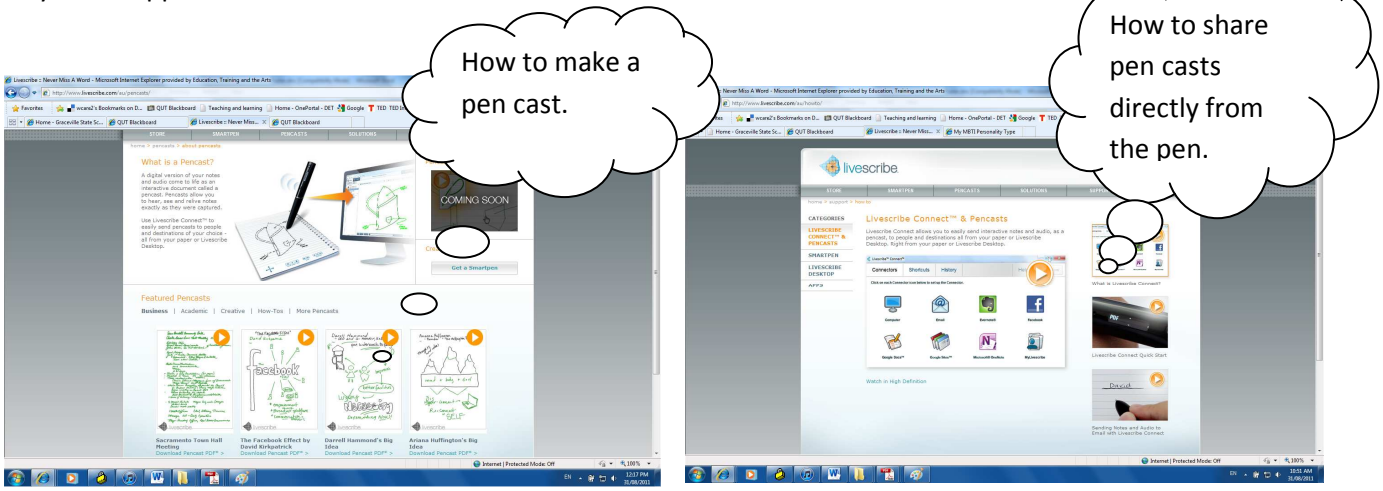
When comfortable with the basics I engaged in dialogue with my work colleague. In this phase of my learning I examined how each of the parts or functions of the device worked as part of the whole. This involved me in combining the writing, transcribing, recording and synchronising functions. This phase of my instructional design was approached from a minimalist perspective (Carroll, 1990) focusing on specific needs, interests and aspects of the technology, checking assumptions and seeking assistance where required.



Analysing Functionally

In further exploring the functionality and opportunities this device presented I revisited the website expanding my knowledge. It was at this point that I believed I had developed the skill and knowledge allowing me to engage in a deeper way. I began challenging my colleague with various ideas for professional applications of this device in relation to student learning and explored the website with her.

In exploring the website the actions were structured in a systematic manner. I had again returned to a Systems Approach.

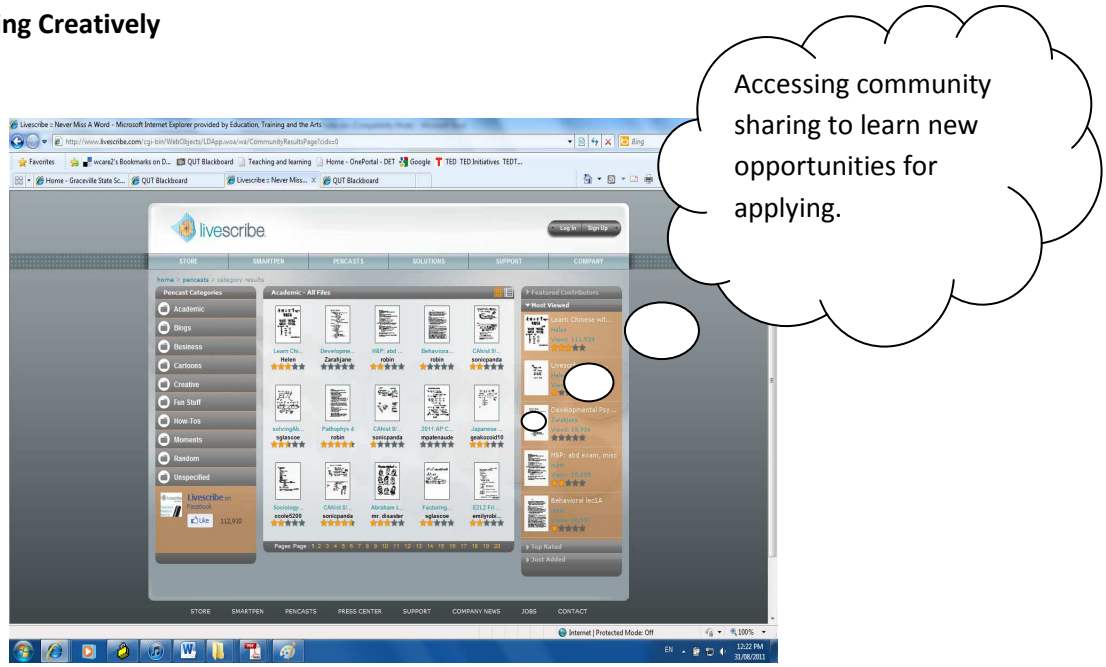


Applying Appropriately

When applying appropriately I found I explored the capabilities of the device and then sharing my learning with others to check perceptions and assumptions. "Metacognition has long been used to describe our knowledge about what we perceive, remember, think and act-that is, what we know about what we know." (Metcalfe & Shimamura, 1994, P.24) It was at this point that I realise I was sharing at a metacognitive level and examining the application of this technology giving consideration to the TPACK model of Mishra & Koehiler (2006).

At this point I also felt that my instructional design frame had again moved to a minimalist approach (Carroll, 1990) focusing on specific ideas, challenges and concepts, exploring them independently then sharing them with my colleague. In doing so we were creating a common knowledge set through collaboration.

Applying Creatively



In a creative sense, I explored the website with a particular focus on the Livescribe community. Through examining pen casts uploaded by others, I was able to identify the various opportunities available for learning.

Conclusions

The Process

In learning about the Livescribe I commenced with what I knew and what I needed to know. Whilst in my professional context I talk to others about the importance of goal setting I didn't realise that I do this intuitively. Covey (1989, p. 98) discusses this as "beginning with the end in mind". If we can visualise our goals clearly and succinctly we can gradually work towards achieving them.

As discussed by Hunter (2004) and supported by Sousa (2006) processing time can be improved by creating a level of concern or anxiety provided the learner is not feeling threatened. The timelines and context of this process created adequate anxiety to place me at the edge of my proximal.

My Learning

I realised throughout this process that I continued to move between the Minimalist and Systems Approaches to Instructional Design noted by Carroll (1990). This became almost intuitive.

I also reflected on the learning approach I took and believe it to be a "Deep Approach" (Thorpe, 2002, p.139) that has a transforming function and intention:

- "to understand material for oneself
- Showing an active interest in course content
- Relating ideas to previous knowledge and experience
- Looking for patterns and underlying principles
- Adopting a cautious, critical stance
- Checking evidence and relating to conclusions" (Entwistle, 1994)

Whilst I note the Learning by Design Framework has been useful in assisting with reflecting on my learning it was certainly not a neat process. There were times that I moved back and forth between the knowledge areas to develop deeper understandings of specific attributes that were of interest to me or necessary to progress.

When using the Johari Window (Shenton, 2007) as a heuristic I realise that this process has assisted me to identify knowledge that was previously unknown and move it to the known. It has also assisted me in identifying knowledge that I possessed on an unconscious level but now identify it this as known.

Opportunities

As this technology eliminates the need to type, it also allows me as "digital immigrant" (Prenskey, 2001) to bridge the gap between my pre digital skill set and digital world.

Given the generational diversity of our teaching workforce, there is potential that teachers, students and other staff who struggle with typing or experience motor difficulties will be able to engage with this technology effectively.

This technology also allows us to move from independent learning to collaborative learning through the transportability of the information and the flexible manner in which it can be transferred from an analogue to digital version for further development. I see it as being advantageous at a student,

staff and school administrative level. Applications to share planning for teachers to use as the basis for differentiation over the school network are quite powerful. Potentially it could also be used as a tool for collaboratively planning and working with both small and large groups of students to support notions of negotiated curriculum, knowledge creation and collaborative learning. One of the great strengths is also its relatively low cost.

The ability to link notes to audio also provides opportunities for students requiring intensive support to hear what was said when notes were being taken or for recording minutes and providing instructions and modelling for students via pen casts. The ability to store pen casts through a virtual community or on iTunes provides access virtually anywhere at any time provided one has connectivity.

Given its portability, the Livescribe pen can be used anywhere at any time provided it is charged and the special paper is available. However, it would be great if it came with a camera that enabled photographs to be embedded in the tests written. The major drawback is that the Managed Operating System (MOE) used in Education Queensland schools will not permit pen downloads to be accepted. As a result, this must be done at home to update pen software. Frustrating!

On completing the task I feel quite competent in using the technology and supporting its implementation within my work context. However, I also acknowledge that my knowledge and understanding has been driven by my purpose for engaging with it. I note that anyone having a different purpose in mind could engage with this technology and find other imaginative and creative applications.

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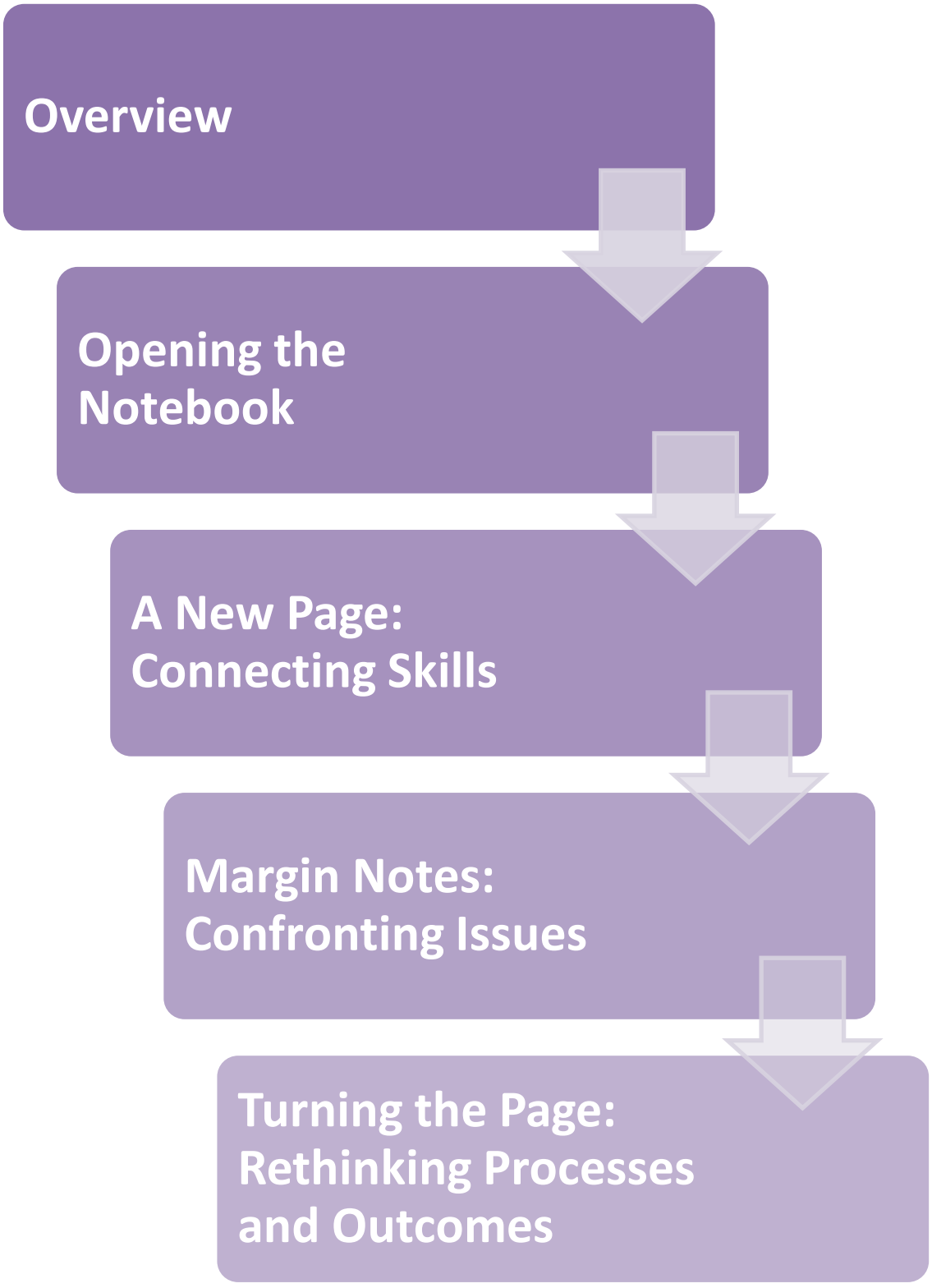
Reflections on Teaching and Learning with Microsoft® OneNote®



Overview

Microsoft® OneNote® launched in 2003 as Microsoft Office OneNote® and has undergone iterative enhancements with the latest product being Microsoft® OneNote® 2010. This product is analogous to a physical notebook with sections and pages (see *Figure 1*). The user creates a new notebook file (saved via Microsoft's proprietary **.one** file format), then creates sections, and then pages on which are stored digital content. The product's functionality enables the user to manipulate the content in diverse ways.

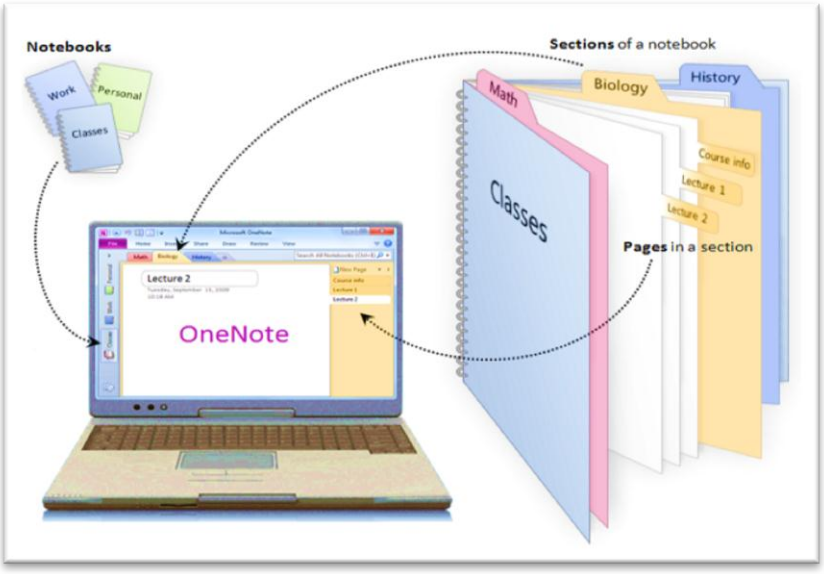


Figure 1: Notebook, Sections, and Pages in Microsoft® OneNote®.

The user can insert content from a broad range of file and media types, as well as typewritten and handwritten notes, the latter being a feature of using OneNote® on tablets and iPads, and is automatically saved in the notebook. The user can search all notebooks for files and text, as well as labelling content within notebooks with pre-set and customisable tags. Another important function of OneNote® is the ability of users to save notebooks online and access, edit, and share them collaboratively. In short, OneNote® is ideal for organising, sharing, and developing information and resources, rather than publishing (Microsoft, 2011; Microsoft OneNote, 2011).

Opening the Notebook

The site at which I am employed as a Curriculum Leader (Years 7-9) is an all-boys' College comprising Years 5 – 12. The College Administration had provided teaching staff with laptops since 2004 and learners usually accessed online information and resources when in labs which housed thirty-five desktops. Whilst the College collected no formal data on out-of-school access and use of computers, anecdotal data quelled the assumption that the majority of learners had influences from home and their broader social milieu that promoted digital literacy and learning through modelling and mentoring, two factors that Warschauer (2007, p. 47) suggests are important for promoting future literacies and digital learning. A few teachers showed competency in using some functions of Microsoft® SharePoint®, essentially a document a file management system, to publish resources on the College intranet that learners could access both at school and at home via 'teacher pages'. Others maintained pages that supported wider dimensions of the College community, namely co-curricular sports and service programs. The key problem was that this practice was sporadic, individualised, and unsupervised, often leading to multiple, conflicting publications of information that deviated from set curriculum and received knowledge about the College and its operations. This was a systemic flaw due to the lack of a clear policy on teachers' use of the College's intranet, specifically relating to use of shared services.

In 2011, the College began implementing a 1-2-1 laptop program for learners in Years 7, 8, and 9. No dedicated learning management system (LMS) was in operation, and there were ongoing deliberations between Information Technology support staff and the Assistant Principal (Curriculum) about the use of the extended functions of SharePoint®, including extended collaboration and social networking. In this context, I identified Microsoft® OneNote® a trial framework for organising and distributing information and resources for teachers and learners. The newly appointed Curriculum Leader (Blended Learning) had provided a basic overview of the features of OneNote® as part of the Staff Professional Development Week Program, and some teachers began exploring its functions with the primary purpose of organising their resources. If teaching staff can be represented as learners in this instance, then Carroll (1990, p. 81-82) sees value in such a "minimalist" approach to technology professional development for teachers, explaining that such an approach

> urges getting learners started doing projects as quickly as possible, allowing meaningful and concrete activity to provide intrinsic learning guidance - rather than relying on the extrinsic guidance of conceptual elaboration and practice with numbered steps, techniques that too often become obstacles to learning. The point of this is to suggest that an appropriate way to view all skill development is as iterative getting started. The implication for instructional design is a requirement to permit users to engage only in personally meaningful activity.

I knew that OneNote® 2010 had useful functions and decided that I would enact my titular responsibilities and lead teachers and learners in how to exploit its potential.

A New Page: Connecting Skills

I had used OneNote® on occasion at a site where I had been previously employed that had supported a 1-2-1 laptop program since the mid-1990s. This was more of a joint exploration of its functions with learners. Together we found out about the quirks of the handwriting recognition software that supported note taking on tablets, as well as the usefulness of composing collections of resources of various types, including images, hyperlinks, and audio / video, that supported projects and assessments. In my most recent experience, I sought to undertake a deeper investigation of the functionality of OneNote® 2010 and to share this with teachers and learners as a starting point for further use. I had taken the lead from the Curriculum Leader (Blended Learning), with whom I had been a colleague at the site mentioned above, and felt confident in my prior knowledge. Carroll (1990, p. 88) asserts that this is an important aspect of technology training design, "understanding the users' prior knowledge and motivation and then finding ways to exploit it . . . to highlight novelties by their contrast with a background of familiarity". I began designing materials and sharing these with interested colleagues, another important, yet perhaps informal, aspect of technology training design by which "communities of experienced users often self-organise" (Carroll, 1990, p. 95).

I initially devised a unit of work that could be packaged and delivered to learners, that incorporated a range of learning activities and resources, and that supported their progress towards assessment. The initial process took approximately thirty hours, during which time I located, created, or modified resources, devised logos and images to signpost foundation (lower order), critical, and creative (higher order) thinking skills, as well as pedagogic modes (see *Figure 2*). I developed questions and problems to engage learners, and organised and packaged the notebook for ease of delivery, organising content in sequenced, colour-coded sections and pages (i.e. Orientating, Enhancing, Synthesising), to enable access, and use by teachers and learners (see Figure 3).

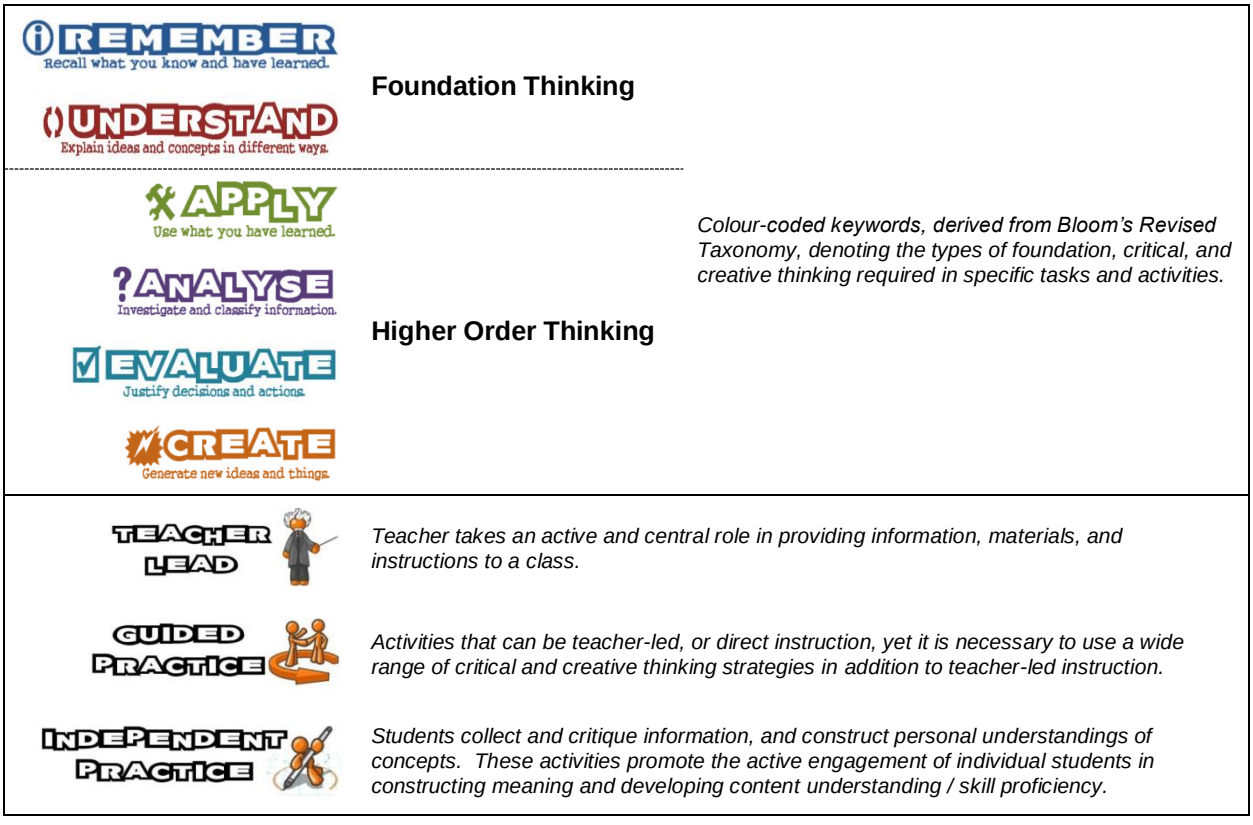


Figure 2: Logos signposting foundation, critical, and creative thinking skills, and pedagogic modes.

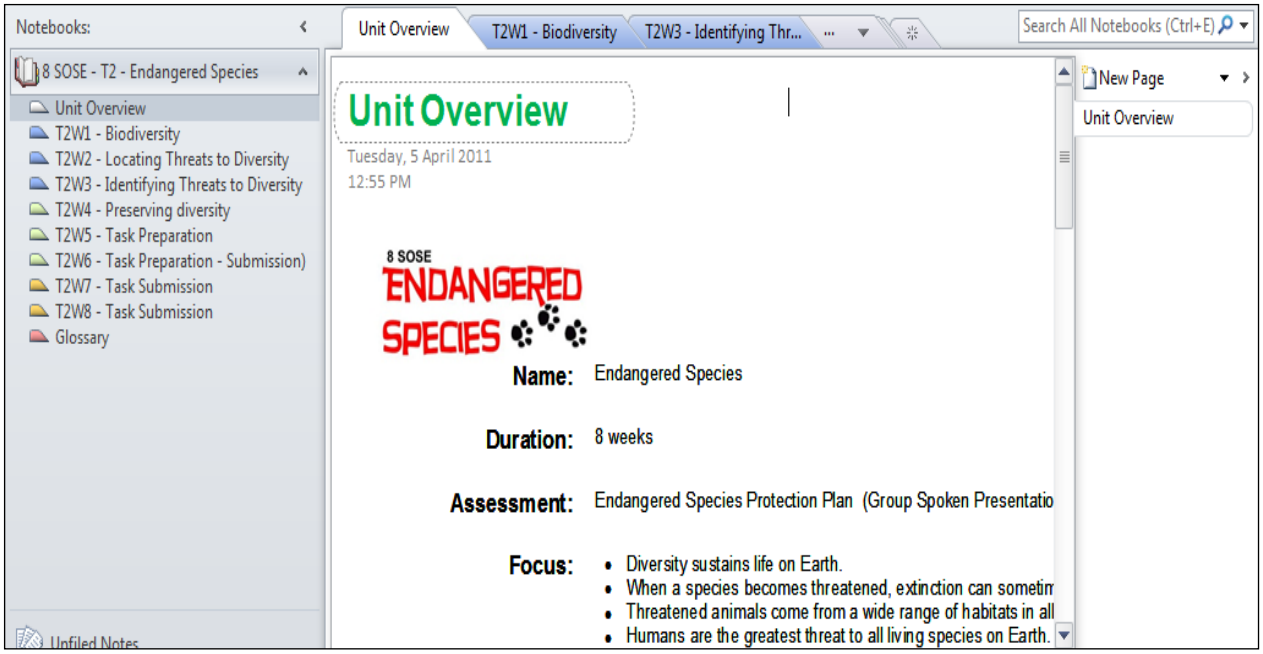


Figure 3: Initial OneNote package sequence and section / page design

One colleague, with whom I am undertaking postgraduate study, is also exploring the conceptualisation and uses of OneNote®. Below is his statement of intent concerning his research and reflective focus, posted on the subject wiki (green highlight), my question to him (yellow highlight), and his response (green highlight).

Scott Adamson	MS Onenote	There are a few areas that I'd like to explore here: 1. Digitising learning experiences for teacher and student reference in classes using MS Onenote, 2. Assisting students to generate class summaries of learning episodes and resources, 3. Guiding students through the research process of an extended response task using MS Onenote Do you see OneNote as the primary delivery / repository, or an intermediary? In Cases 1 and 2, OneNote would be the primary delivery of our class set of summaries and resources, whereas in Case 3, the research process will be guided through the use of OneNote, but not the ultimate assessment to be submitted, so in this sense it would be an intermediary.

What is important about this professional exchange is the degree of commonality in our assumptions about the initial functionality of OneNote®: primarily utilised as a delivery mode with some opportunity for guided and independent practice. My purpose for trialling this product at my site was to highlight potential uses and invite critical discussion about the use of OneNote® in the context of curriculum imperatives and pedagogy, bearing in mind that this would be an iterative journey. Indeed, the Assistant Principal Curriculum showcased the package to the College Leadership Team, then Heads of Curriculum, and then teaching staff. The responses were varied, ranging from acceptance to anxiety. What follows is an analysis of factors that led to this array of attitudes and assumptions including reflections on my own motivations and actions.

Margin Notes: Confronting Issues

Driving my motivation to design and deliver units using OneNote® was the imperative that technology was to be embedded in teaching and learning and that the 1-2-1 laptop program had to show evidence of teacher and learner engagement. There were a number of system controls, namely those governing permissions and limiting access, which precluded independent exploration by students of the netbook device and its functionality. These stemmed from a fear of inappropriate use and being "off-task on-line". This was an important factor in my desire to create a teaching and learning package that was relevant but mediated in the context of the control measures. The College had invested a significant amount of its professional development budget in developing a "thinking curriculum" and the expectation was that all unit and lesson design and materials indicate a sustained connection to the promotion of foundation and higher order thinking skills. This also meant that the teaching and learning process was a highly managed process characterised by the delivery and consumption of knowledge and resources. Whilst this was useful in providing a single package that was uniform across a key learning area in a specific year level, it was not without problems that required confronting.

I established a discussion board through which I invited colleagues to provide feedback on the initial trial, listing "Strengths" and "Improvements". An abridged summary appears below:

Strengths	Improvements
• OneNote T2 format provided an indication of what can be done to make it easier for students (and parents) • Term planners – clear and thorough. • Homework activities enhanced learning in the classroom and developed higher-order thinking • T1 Assessment (Mini-documentary) was wonderful! Students loved using the movie maker technology, despite the difficulties. They loved the visual literacy aspects of the task and it gave them the opportunity to focus on something they were passionate about e.g. Great Barrier Reef, Daintree rainforest, etc. • T2 Assessment (Endangered Species) was fantastic! Students were engaged with the task, and challenged. Activities (S…W…So What? etc.) promoted higher-order thinking. • I have found the questions posed for the students adequately challenging to stimulate their minds and lift their level of responses. I have found that I am challenging the students to answer the questions purposefully and ensure that their understanding of what is being asked is sufficient.	• Content vs. Skills: T1 seemed very content heavy and rushed. This meant that it was difficult to embed a theory + hands-on/do activity in one lesson to keep students engaged, and give them the opportunity to 'do' what they learn; or it also meant that not enough time was catered for in terms of scaffolding. Acknowledgement that T2 saw this improve. • Some in-class time is needed to work on assessment e.g. Teacher scaffolding, then students do. I didn't see enough time built into the term planners to facilitate this. • Collecting the mini-documentaries (i.e. they present it to the whole class, rather than spending several lessons trying to collect them) • PDF documents. Sometimes they work brilliantly, sometimes they do not. Perhaps this is a general IT issue? As we are pursuing the integration of laptops in the middle school phase, perhaps we could seek a more user-friendly software package? I only speak of this issue as I regularly have students who genuinely are unable to save/re-open, click on boxes, etc.

This initial feedback does not reflect the topics of later, informal discussions in which colleagues indicated that they had a better idea of how to use OneNote®, but felt excluded from the design and planning process. This was important feedback and challenged some of my assumptions and motivations. It should be noted that at the time of writing a learner survey is being designed to gather data on student experiences with the initial trial. For now, I will focus on reflecting on teacher feedback.

It is clear that teachers wanted more autonomy in the design and delivery of OneNote® packages. I was interested in sending the invitation to consider OneNote® as a tool or medium to enhance pedagogy with the explicit understanding that I would also have to develop andragogy, learning strategies focused on adults, to support teachers. Warschauer (2007, p. 45) agrees that there is a paradox here in which "people develop the ability to work autonomously, whether in online or offline realms, only through processes of being instructed or mentored by others". I balanced the need for direct instruction with the latitude for independent trial, an alternative vision of a learning situation that Carroll (1990, p. 89) describes as one that "abounds with rich meanings and experiences, the chance for discovery, the possibility of achievement", adding that "[f]ew experiences motivate people like errors", concluding that "the situation provides the curriculum rather than being replaced by a curriculum". At stake here, clearly, is teacher perceptions of self-efficacy and reputational standing among colleagues, in the eyes of the students, and the wider communities. I contend that I would not have been reckless to the extent of trialling the use of technology that would ultimately

threaten pedagogy or the professional standing of colleagues. What I wanted to challenge, in terms of andragogy, was colleagues' assumptions that they had reached an end point in their understanding and use of technology as professionals and to invite them to reconsider their roles and assumptions about such. Loveless et al (2001, p. 67) begin this discussion by asking teachers to consider the strategies that they use to enhance learning, whilst more deeply exploring how they use information. What is central to my motivation was the desire to develop the understanding that

> constructing knowledge from information requires far more than the ability to use a variety of ICT techniques or skills with the latest range of software applications: it relates more to ail ability to question, access, interpret, amend, analyse, construct and communicate meaning from information [and having] the qualities and capabilities required in order to recognise the distinctive contribution which ICT might bring to a learning situation and know when and how to use digital technologies appropriately.

Loveless et al (2001) have to amalgamate their beliefs about their subject knowledge and about the underlying conceptual framework for using technology (p. 69), even stressing that there is a shift from "old" to "new" pedagogy that sits at the core of professional responsibility, classroom management (p. 78). How teachers, and learners for that matter, come to more deeply understand this is ground for philosophical conjecture. Sfard (1998) offers an explanation that understanding about leaning knowledge and skills can be considered as metaphorical dichotomy of processes of "acquisition" and / or "participation". In the context of a 1-2-1 laptop program, Warschauer and Matuchniak (2010, p. 205) contend that "daily access provides the opportunity for greater mastery of computers and their deployment for writing, research, collaboration, analysis and publication", echoing the acquisition metaphor. They offer a corollary to measuring knowledge in a 1-2-1 classroom via an acquisition metaphor, which is explicitly grounded in a success / failure binary:

> The lack of positive results may be possibly explained by poor implementation of the programs, likely heightened by the fact that teachers were assigned to use a program rather than empowered to choose one themselves, as well as too early testing; technology-enhanced reform is somewhat disruptive (involving new equipment, new ways of teaching, etc.) and thus positive test score results may not appear until the second or subsequent year (p. 206).

This also means that the iterative journey must continue, but with the benefit of feedback to inform the rethinking of processes and outcomes, and with the aim to adopt a more participatory metaphor of learning.

Turning the Page: Rethinking Processes and Outcomes

Central to the enacting the participatory metaphor of learning in this instance is a heuristic approach to design (Carroll, 1990, p. 76). Further anecdotal feedback from teachers indicated that they would prefer that both teachers and learners have more time to more deeply engage in activities that presented challenges to their existing knowledge and skills. Discussions with the Assistant Principal Curriculum shaped a working design framework for Years 7, 8, and 9 that will be informed, but not constrained, by specific imperatives in framing documents such as *The Melbourne Declaration for Educational Goals for Young Australians* (2008), the National Assessment Program, and the Australian Curriculum. Rather than a 'must know / must show' checklist discourse, learning in the Middle Phase of Schooling at the site in question will continue to be problem-based, project-based, and inquiry-based, yet with a refinement in assessment types and timelines. This will require a sound theoretical base to enable a rethinking of processes and outcomes, as well as practical demonstrations of how to enact this shift.

Rethinking technology use is a systemic issue. There are a number of theoretical models that help frame the processes and outcomes involved. Loveless et al (2001, p. 80) provide a comparative table of old and new pedagogies, whilst Mishra and Koehler (2006, pp. 1038, 1041, 1047) provide a "technological pedagogical content knowledge" (TPCK) framework as well as proposing a "learning technology by design" methodology and a "design teams" model. Thorpe (2002) considers the concept of "communities of practice" characterised by varying attitudes towards dependent and independent learning in a network of practitioners, although Fuller et al (2005) highlights the important connection between the "disposition" of learners and their empowerment, an issue discussed in more detail by Ritchart and Perkins (2008). What is clear here is that the device or the product is not as important as the pedagogy / andragogy. Murgatroyd (2010) asserts that thinking, making, and doing is the simplest descriptions of the processes that develop most effective set of competencies and skills. At the centre of the process that develops these should be "wicked problems", which he explains "when based on genuine community or organisational needs, require learners to develop skills and competences and also responsibility dispositions which should be characteristic of 21st century learning and teaching" (p. 267). This enables the enhancement of positive learner dispositions and growth of what Bigum and Rowan (2009, p. 136) describe as "knowledge producing schools". Collaboration between teachers and learners is vital, as is an understanding of the discursive exchanges that exist between them in the teaching and learning process. Laurillard (2009) constructs this as a "conversational framework" and provide a checklist of its desired features. A framework such as Laurillard's is useful and modifiable, yet in this context, it can be simplified to capture the pedagogic / andragogic relationships at play (see *Figure 4*). This simplification, whilst acknowledging the hierarchal relationship structure common to many schools, shows a process in which teachers and students, either individually or in groups, are empowered as agents (indicated by larger font) that facilitate teaching and learning at different stages of the process.

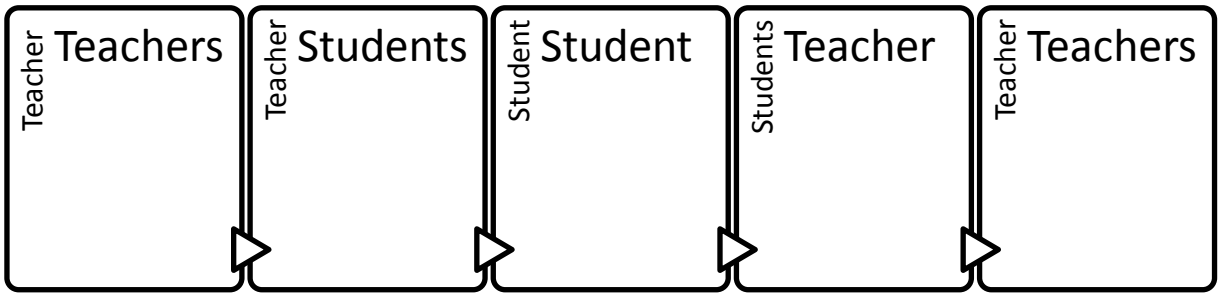


Figure4: Pedagogic / andragogic relationships in teaching and learning.

This model must not be considered as explicitly linear and will withstand interrogation and intervention at various points, although this resilience depends on the modes and instruments that measure the outcomes for teachers and students. Warschauer and Matuchniak (2010) hope that this empowerment will help teachers and students, adults and children, effectively "reposition" themselves through their learning with and about technology. They temper this vision with the reality of measuring performance as an indicator of learning, warning that the traditional approach that measures basic competencies leads to a lack of ideation

and innovation, as well as diminished incentive to explore advanced techniques. Their solution is to "measure what we value" through classroom performance assessment, a process that will "necessitate providing teachers with the training, resources, administrative support, and incentives to reorient their instruction and evaluation of students to focus on the development of expert thinking" (p. 216). Teachers should also investigate the deeper and broader ranging effects of technology in the curriculum, in this case the understanding and use of Microsoft® OneNote® and its extended functionality, as part of building the corpus of defined, specialised, theoretically sound knowledge about the experiences of those involved and, as Selwood and Twining (2005, p. 7) point out, re-establish their professionalism through action research. This would be central to the teacher / teacher relationship indicated in earlier (see *Figure 4* above).

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GLOGSTER: DIGITAL COLLAGE TOOL

INTRODUCTION TO GLOGSTER

When I first came across Glogster, it was clearly articulated that it was a facility to create and present creative information such as a collage, poster, journal or similar digitally. It was not something new and unfamiliar, but rather a digital replacement for a traditionally analogue task.

Glogster is a web.20 tool. Web 2.0 is described as "the second stage in the evolution of the World Wide Web; this second stage is characterised by the deployment of a set of technologies that enable the Web to be used in a different way than previously" (ITG Research Team, 2008).

WEB 2.0 KEY CONCEPTS

Web 2.0 allows for services which you previously had to find, purchase, download, install and use on your desktop computer, to simply be accessed and used online. The outcome of this is called Software as a Service (SaaS).

This basically means that the web is no longer just for retrieving information, but also for creating, sharing and interacting. Web 2.0 supports the further development of web activities such as **online networking, user involvement, creativity and online collaboration.**

THE GLOGSTER EXPERIENCE

As I do not work as a teacher, and had no opportunity to really implement the classroom management and collaboration tools, my learning experiences and reflections were mainly based around just the Glog creating feature of the website. The learning was informal and self directed. Through reflection, a general learning process was identified and presented. This learning process is relatable to learning new technologies, as it outlines how knowledge is acquired and subsequently used. It is concluded that gaining knowledge of tools in new technologies is reliant on an awareness that the tools exist, because otherwise they will not be searched out.

GLOGSTER: FIRST IMPRESSIONS

The number of potential applications for this in an educational context seems unlimited, and the potential benefits that it has in an educational context as a replacement for traditional poster creation is not lost on me.

Due to my extensive experience with self learning unfamiliar digital programmes and tools, combined with my existing knowledge and familiarity with more sophisticated and elaborate graphic design programmes (such as Adobe Creative Suite 5.0), I felt like I knew how to use Glogster instantly. It was almost intuitive to use, as it had not reinvented the wheel, but simply refined, simplified and streamlined a selection of features offered in other comparative programs.

FEATURES

Creativity

- The features allow for freedom to add a wide range of provided graphics and tools, as well as allow users to add and use their own multimedia.

Online Classrooms

- One teacher can link 50 students to their account (in the free version, and more if a subscription is paid)
- Allows for teachers to manage classes and monitor the progress of the students.

User Involvement

- With Glogster, the user creates the presentation, and allows the user to collect and create data however the user desires.
- The facility is flexible to different ages, abilities, and learning styles

Collaboration

- "Glogopedia" is a collection of Glogs created by other users, which are presented for everyone to see.
- These can assist students in inspiration and ideas, as well as gain experience with critical literacy when judging the credibility of other information.

CRITICALLY REFLECT

My exploration of Glogster was separated into two sections:

1. The initial browse of the website and it's features
2. The actual use of the website in order to complete a set task

LEARNING METHOD ONE: JUST BROWSING

My initial use of Glogster was just clicking around and exploring the website. These were the main things I explored:

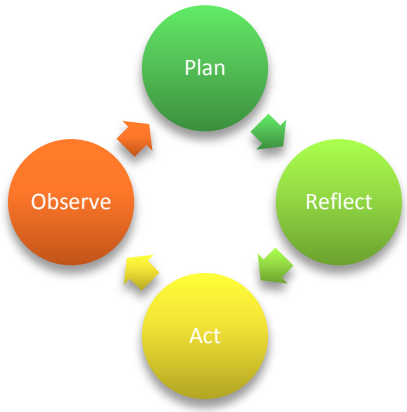
- The information pages of the website, describing the features of the website
- The video published on YouTube (included in my Glog).
- The Glogs produced by other Glogster users
- The actual Glog creation facility

When clicking around the website, I found that I felt quite comfortable and confident in my ability to navigate myself around the website in order to use the features and also seek out help when I required it. The Glogster toolbar seemed simple and intuitive, and I tried out each of the features on the toolbar. I was impressed by the amount of already available images and graphics.

It is interesting to reflect on the fact that I only searched out help when there was something that I knew I wanted to do, I just didn't know how. I did not seek out to learn new tasks, under the assumption that I already knew everything that could be done, and all I needed to know was **how** to do those specific tasks at times when I was unsure.

I see the same behavior in people I train to use excel, who will do a mundane task over and over again, instead of asking themselves if there is a way to do the same task in a more efficient way and seeking out the answer. This is because they similarly assume that they already know everything that can be done, and there is no more to learn than what they already know.

LEARNING METHOD TWO: LEARNING IN A CONTEXT



I didn't touch this assignment for a month because I was struggling with what I really would have to reflect on because I thought the whole thing was so easy, and I didn't have any real learning challenges to reflect on.

In order to facilitate some deeper learning experiences, I followed the Action Learning process, (Action Learning and Action Research Association, 2008). I planned a task for myself so that I could use Glogster in a specific context rather than just vaguely clicking around.

MY TASK: *To create a Glog which could be included in this assignment, demonstrating the features of Glogster in a more interesting way than in a word document.*

My Glog

Due to my experience with these types of technologies, I had a high standard to expect of myself when producing any kind of poster/visual presentation. The Glog which I produced, to me, is disappointing and unimpressive.

EXPLORING FEATURES & EXPLOITING PRIOR KNOWLEDGE

Through exploiting my prior knowledge of these types of digital tools, I planned to be able to ascertain any gaps in knowledge and seek them out as I identified them. For this reason I was not inclined to refer to a help guide or search for assistance on Google when I was struggling, because I preferred to search out things through my own Action Learning, and through inevitably making mistakes. I exploited my prior knowledge to my own benefit, as this enabled me to get straight into the exploration of the tool, rather than have to read through a manual or equivalent first. As I progressed, this proved to be a valuable practice, as I realised that often through trying out new buttons, I would stumble upon features which I would have otherwise not known to look for. An example of this was that I ended up accidently finding out how to add links to titles and graphics in the Glog.

Discovery: Some features in Glogster are not presented very clearly and require searching around to locate

IMPLEMENTING FEATURES

Upon scratching the surface, Glogster was not actually intuitive at all, as I had first suspected. Finding graphics and adding them was easy, however once I needed to resize them, move them, change colour, text, font etc, or do any kind of secondary action on an item, it was a very different experience. I worked it out through clicking around usually, but was often frustrated with the limitations or how slow the process was. Changing the font size in particular was not very logical, as when the text size was changed, it did not always change the way that the text was distributed, and it was difficult to modify this. *Discovery: Adding items into the Glog was simple and easy; however making any modifications later on was complicated and confusing, if optional at all.*

CREATING INFORMATION

I found as soon as I tried to put more than a few words of text into the Glog, it became difficult to manage and edit. When observing the options provided for normal text compared with those for titles and speech bubbles, it became evident to me that Glogster was promoting the use of fewer words, while marginalising the opportunities to use sentences or any larger body of text.

Discovery: Glogster is best used for brief headings of text accompanying pictures and graphics rather than full sentences or paragraphs.

In response to my discoveries, I modified my expectations of the produced Glog, as I realised that I would not be able to include as much descriptive text as I intended.

The discoveries from the experience revealed that Glogster had limitations. Upon reflection, it is inevitable that this would have been the outcome, as I was comparing Glogster to my experiences with more sophisticated professional software programs. Modifying my expectations of the final product to be more reasonable within the capabilities of the tool improved the production experience; however the final product was still overwhelmingly unimpressive.

Initially, when I was just doing shallow tasks with no purpose or direction, I was wistfully thinking about all of the great ways that Glogster could be used in classrooms or businesses, and for people of varying ages and abilities. I eventually realised that once I began to use Glogster for a chosen purpose, I became so frustrated that my thoughts were no longer visionary imaginations, but rather brainstorming of any alternative **other** than Glogster.

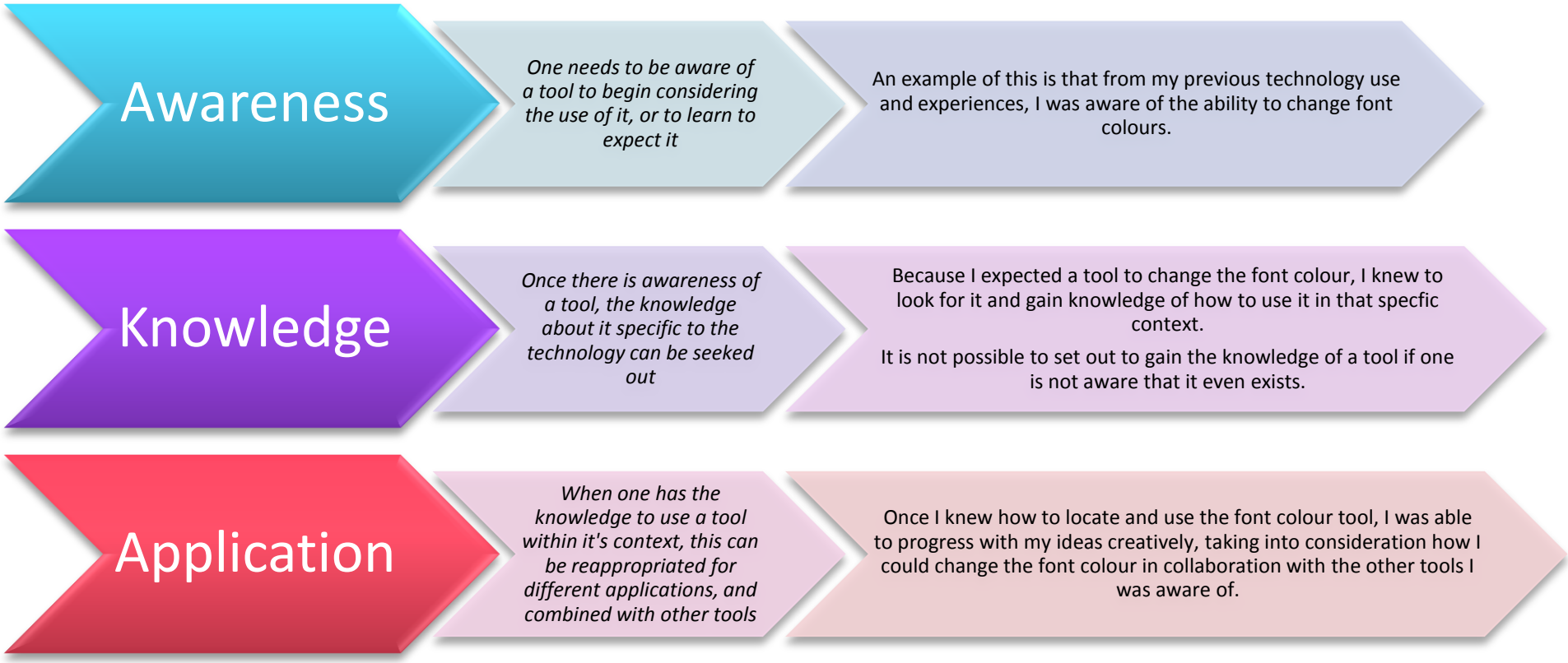
INTERPRET

When comparing the two learning methods, it is clear that a lot more learning occurred when actually using the Glog for a specific purpose. Carroll (1990) discusses research which concluded that activities undertaken in the service of a meaningful goal were remembered more effectively than those undertaken merely as a means to an ends. It certainly was more engaging to have a goal to achieve, because I actively searched for, and gained knowledge of how to use the tools of Glogster which enabled me to achieve that goal.

My behaviour demonstrated the Action Learning process, because I continually reflected on my task, and made modifications to my plan in response. When interpreting the discoveries that I made, it is evident that they are all related to my expectations of the tool, rather than my abilities. The perspectives of a learner would perhaps be different if they did not have an alternative way to create an essentially similar product.

LEARNING: NEW TECHNOLOGY TOOLS

My learning was self directed, and I searched out tools in Glogster which I expected to be available. Part of this learning choice meant that there were inevitably elements of Glogster which I did not use, as I only looked for tools which I knew to expect. It became evident to me that there was a pattern in the types of information I searched for, and how/if I used a tool was completely dependent on which level of the process I was at with that particular tool. Below is a demonstration of the heuristic of the process of Acting Learning:



From my understanding of how I learnt through exploring Glogster, I interpreted that the fundamental concept which is required for successful informal, self directed learning is awareness of tools, because once there is an awareness of a tool, and an expectation of its presence, it is then seeked out, and knowledge is gained as a result.

RELATING THE IDENTIFIED PATTERNS WITH HISTORIC EXPERIENCES

My behaviour was consistent with the "Getting Started Fast" desire described by Carroll (1990). Taking into consideration the implications for this in a classroom, and the basic human need to get something done, students would most certainly have the same desire to "Get Started Fast". This is an opportunity to engage students immediately and allow for their subsequent problems which arise due to gaps in the knowledge to be learnt as the need arises.

After identifying the pattern demonstrated above, I realised that the same trend appeared in other technology learning experiences that I had been a part of historically.

PHOTOSHOP

An example of the student's desire to "Get Started Fast" and also the diagram of the learning process I outlined above were in a grade ten class that I taught during my teaching experience. My task was to teach them how to use Photoshop. Photoshop is significantly more advanced than Glogster, however comparable in the way that there is a blank area and a toolbar.

Despite their prior knowledge of the outcomes of Photoshop, the students initially only searched out tools that they were aware of and familiar with using before, similar to the tools in Windows Paint. Once they gradually became aware of more tools, (for example quick selection, gradient overlay, layer manipulation) the students were then producing more complicated work, because they were using their knowledge of the different tools combined with each other for different applications.

No matter how impressive their use of the tools became, the students were always limited by their awareness of the tools, because they rarely gained knowledge of a tool unless they were firstly aware of the fact that it existed.

MICROSOFT WORD

When considering this concept, I can see the pattern emerging with almost every technology I have ever used, and I see the same behaviours with myself and other people who use the same technologies. For instance, I have been using Microsoft Word for more than ten years. I have gone about my use of the program using it for the same kinds of tasks over and over again, yet I rarely click on a button I don't know of to see what it does just for the purpose of exploring.

There are certainly features of word which are unknown to me yet have the potential to improve my productivity or ease of use. I am just not aware of them. A few years ago, I was made aware of the Format Painter button, and this was an example of one which I immediately recognised the value of, and so was motivated to gain knowledge of how to use it. It subsequently has become something which I apply to a wide range of tasks and programs, and makes a valuable contribution to my productivity. It also is from my experience, the most commonly unknown yet useful feature of Microsoft Office.

CONCLUSION

From the experience, I came to the conclusion that while Glogster isn't that bad, it certainly is not the best in its field. Despite this, the reflection of my learning revealed an obvious pattern which contributed to a useful guide for how new technologies are learned.

Moving forward, when planning learning experiences, I will be taking into consideration the discoveries that I made through this experience.

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How Smart is the Smartpen?

SETTING THE CONTEXT

LEARNING FROM THE LEARNING: REFELCTION ON THE SMARTPEN

Context

As a science teacher, I was becoming increasingly frustrated with the use of the netbook (as shown to the right) in my classroom. Students were unable to complete chemical equations or genetic punnet squares with the correct symbols and annotations in the word processing programs. To solve this, the class reverted to the use of traditional note taking. However, this meant that all the preparation for classroom practise questions, homework and exam papers, was once again being prepared onto paper. These answers then photocopied for each member of the class, or scanned, converted and uploaded to Moodle.

It had me thinking there must be a better solution.

Solution

After browsing through the ED642 wiki, I saw that a fellow student had nominated the Smartpen for their assignment. Intrigued by what this was and how it might be used, I set about a Google search. What I found sounded perfect. So I headed to Officeworks and purchased the complete Livescribe Smartpen 2GB package.

Thinking about the solution

As a started to think about when, where and how to use the Smartpen, these thoughts began to fuse together; the benefits, problems and solutions. de Bono (1995) compares this situation to throwing several balls in the air and trying to catch them. Subsequently, de Bono introduced the six thinking hats model. This is a system of conscious thoughts, which focuses an individual's attentions in a specific direction to reach the desired outcome (de Bono, 1995). The six thing hats model, is commonly used in many education systems, including in Western Australia.

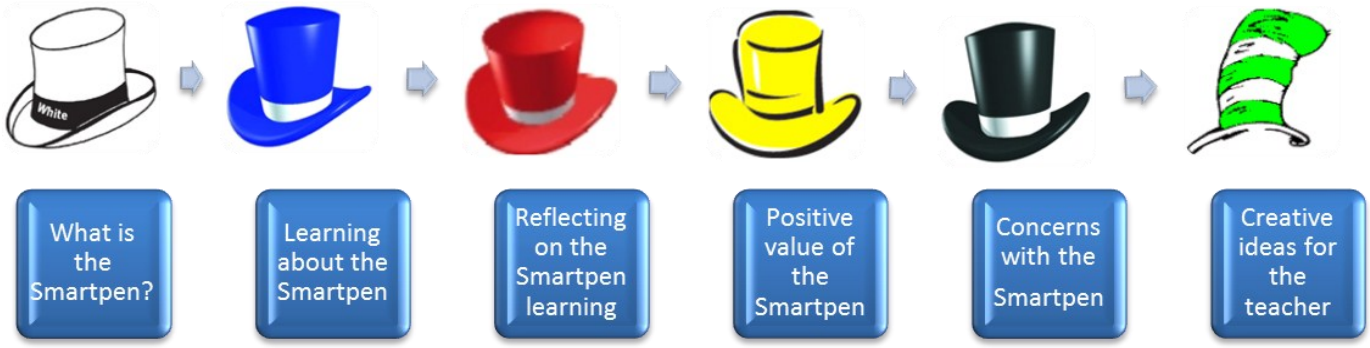
What follows is a case study and reflection on the processes, use and potential for the Livescribe Smartpen, following the de Bono six-hats thinking model.

SOULTION

The Livescribe Smart pen will be used in this guided reflection as a tool for teaching and learning in the science classroom

What is the six thinking hats method?

In 1985, de Bono, developed the six-thinking-hats method to break down the steps involved in the thinking processes within problem solving (de Bono, 1985). de-Bono invented six coloured hats, which represent six different types of thinking: the factual white hat, the metacognitive blue hat, the emotional red hat, the positive yellow hat, the critical black hat and the creative green hat. Research has shown that the use of all the six thinking hats, in a single holistic thought system, leads to efficient and effective problem solving (Powers & Jones-Walker, 2005). Through the course of this reflection, each hat will be worn to reflect on the learning processes, problems and solutions discovered through the use of the Smartpen.



WHAT IS THE SMART PEN

FACTS ABOUT THE SMART PEN

The Livescribe Pulse Pen (LPP) brings audio capability to a visual tool engaging writers as never before (livescribe.com). Writers write with ink onto special laser paper made with invisible dots. Inside the pen, a voice recorder records sound that occur while one writes; this can be enhanced by the head set included in the package. The tip of the pen encases a small, micro camera, which photographs the dots and saves them in a memory chip (Livescribe Inc., 2007). The microcomputer within the pen is able to record the sound that belongs to each word. When the user taps on the words, the recorder plays back the sounds recorded at that time (Covert, 2008).

Further to this the Smartpen is then connected to the computer via a USB interface, to manage and install written documents as PDF's and audio files. This provides an interface for the management of documents and with the installation of the Livescribe Connector program; the user can share the documents and audio files on programs including Facebook, Microsoft OneNote or onto the computer (as shown to the right). Additional features of the Livescribe Pulse Smartpen include performing calculations and translating foreign languages (Covert, 2008).

WHITE HAT

The white hat, is the information one, is the one related to facts and data. The white hat describes the presentation of information in a manner that is neutral and objective. It should be expressed without position, opinion and feeling towards the information presented (ISATT, 2007).

THINKING ABOUT THE THINKING

BLUE HAT

The blue hat, reflects the sky above, signalling concentration, reflection, metacognition (thinking about the thinking required) and the need to manage this process (Serrat, 2009).

The Blue thinking hat is associated with metacognition, which, according to Wilson (1998) is the knowledge and understanding one has of their own thinking processes and the ability to evaluate and reflect on these processes. Flavell (1987), states that metacognition consists of both metacognitive knowledge and metacognitive regulation. Metacognitive knowledge refers to acquired knowledge about the cognitive processes, knowledge that can be used to manage personal, cognitive processes. Whereas, metacognitive regulation involves strategies that are sequential steps to controlling cognitive activities, and allow the cognitive goal to be achieved. The metacognitive steps shown below are elements of the thinking experienced during this phase and are based around the work of Flavell (1987).

THINKING ABOUT THE THINKING

Steps to understanding

Metacognitive knowledge (Planning and Awareness).

According to NCREL (1995) it is necessary to recognise what prior knowledge one brings to each task, how this knowledge will assist or undermine their potential and what steps should be undertake to achieve the desired outcome.

In reflecting on each of these things, I acknowledged that whilst I had no knowledge of how to use the Smartpen, I have strong digital literacy and also a passion for exploring new things. Thus, the first step was to rip open the packaging, take out the pen and usb port and insert into the laptop (as shown below). This began the journey of discovery.

Insight:
What type of knowledge do you bring to this task? Will it influence your ability to learn the smart pen? Something we must consider with our students.

Metacognitive Regulation

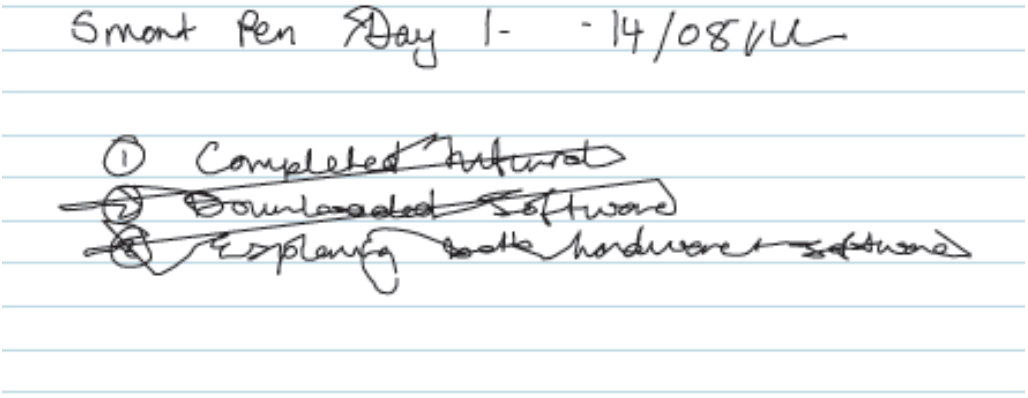
After initialling rushing into the setting up of the Smartpen, the first experience with how to use the pen involved the Livescribe tutorial (click to see the tutorial). This provided basic pointers both through visual and audio cues on how to navigate, to write and record audio with the pen, this kinaesthetic learning proved to be a valuable tool. This provided to be an effective guide to getting started, and now with more confidence, I installed the Livescribe software. What I soon discovered, began to both amaze and overwhelm me.

THINKING ABOUT THE THINKING

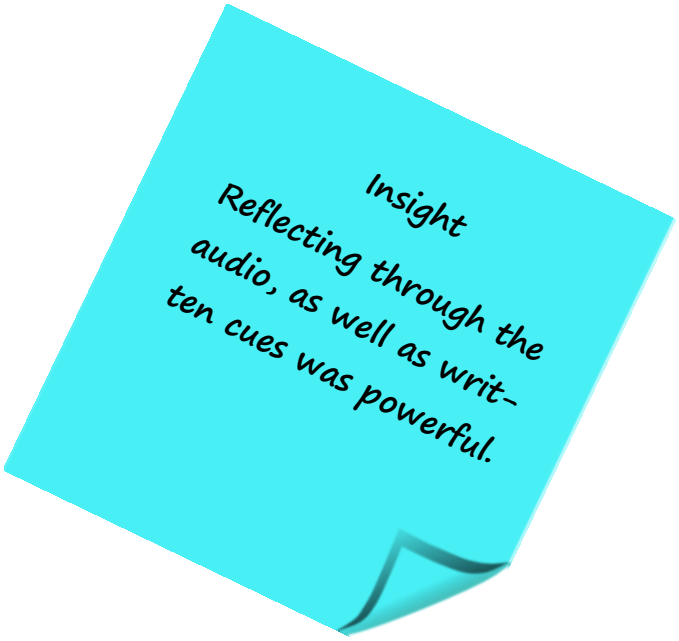
Steps to understanding

Trial and Error

Following the introductory tutorial and navigation through the software, I now felt confident enough to conquer this program alone. So I set about keeping a journal of my progress with the Smartpen and A5 notebook. As you can see below entry one was a success, well nearly.



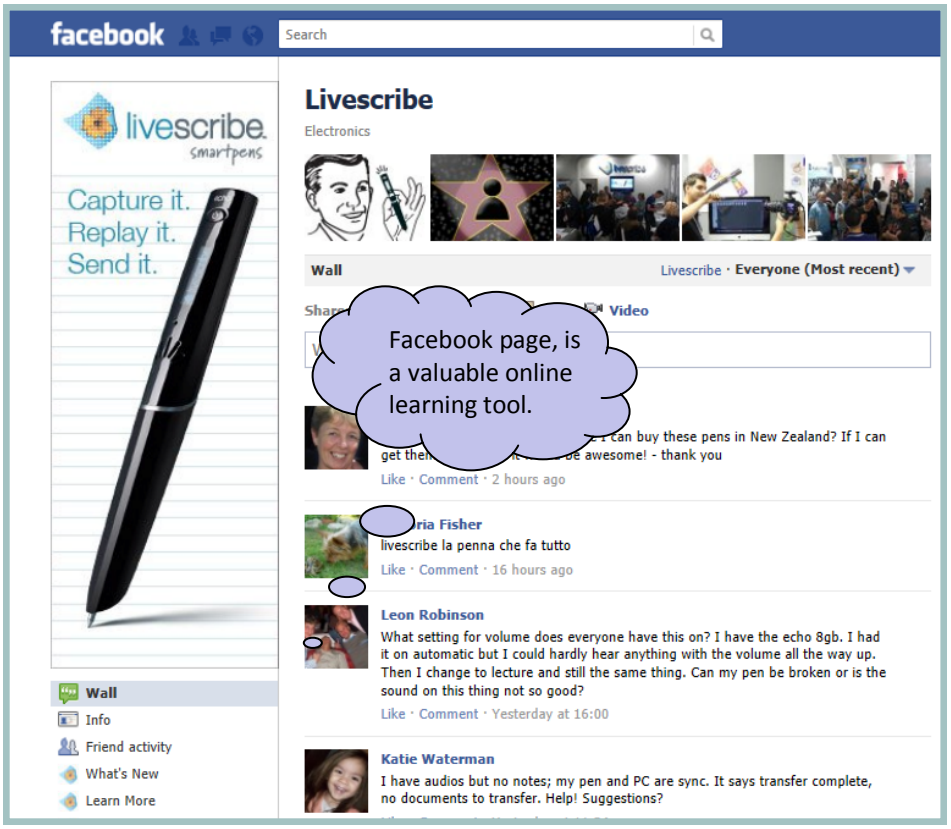
Whilst the writing was a little messy, it was clear that the audio was working and so to was the pen. This left me to explore how I could use my Pencast with other programs and what I needed to do to get this working. This became the first stumbling block. I was able to write, record and upload all of my Pencast to Livescribe, however, all attempts to sync them with other programs such as Onenote or Facebook, were unsuccessful as I had no connector.



Online resources

At the point of frustration I turned my search for answers, to the World Wide Web. After googling Livescribe connector troubleshoot, I found myself at the Livescribe help page and with this many useful threads within the forum page and also an instruction video, that gave advice on how to use the Livesribe connector program. Within minutes of watching this I had downloaded the relevant software and was now able to sync with Onenote.

I also found a community of users, who share their pencasts and a link to the Facebook page, which I then joined. The Facebook group which has over 113, 000 followers, was another online source of forums, technical support and online resources.



Following this, I became in control of the learning experience. Within a week, I had created my first Pen-cast for use in year 10 chemistry (Click here to view appendix 2)and was very pleased with the feedback. I continued to use the web, as a source for teaching ideas and aides, amazed at how much was available.

REFLECTION

EMOTIONS AND EXPERIENCES

Based on the work of Kriewaldt (2001) it can be said that reflection is the act of thinking before, during or after an event. In this case, the red hat is worn for the emotional reflection on the learning processes. What happened, how did it happen and what did I feel?

As a digital native, that is someone who speaks fluently in the digital language of computer, video games and the Internet (Prensky, 2001); reflection is not my strength. Prensky (2001), argues that reflection is something that needs refining in digital natives, who have grown up with high speed digital technologies. He challenges us to think of ways to include the reflection in the learning, within the confides of the digital language. This was a challenge I took up and kept a journal of observation using the Smartpen. This journal is the basis for the reflections that follow.

The work of Caroll (1990) identifies the use of goals and the coordination of prior knowledge, as necessary for both meaningful learning and experiences. As noted earlier, the kinaesthetic tutorial was of value to the learner. This supports the assertions of Caroll (1990) that plodding through the framework may not be the most effective method for learning. The nature of the learning offered by Livescribe tutorial followed the same basic principle identified by US Army training in 1977 as instead of reading, it helped the learner to do something (Caroll, 1990).

During the stage of discovery, I did become frustrated when I could not simply sync the programs, as I wanted. At this time, as digital native, I turned to google for assistance. The use of networks such as forums, Facebook and youtube, is described by Siemens (2004) as a connection of people who are able to foster and support knowledge flow. Siemens (2004) infers that the use of social networks results in effective knowledge flow. Warschauer (2007) also suggests that self directed learning via online information and digital tools is powerful to instigate change. This is how I felt, empowered. A notion that I share with many students who are use their own personal networks to learn, to share and to connect (Siemens, 2004).

Reflection is more than a final step as it occurs *in* action and *on* action (Schon 1987). This reflection above shows that no one method of learning is right or can be used in isolation. I preferred to enhance the experience with differing approaches. The following strengths, weakness and uses of the Smartpen are reflection both in and on action.

The work of Prensky (2001) challenges not only the learning we undertake, but has implications for the students we teach.

VALUES AND ADVANTAGES

WHAT ARE THE BENEFITS OF THE SMARTPEN

Smartpen technology offers educational advantages that can be exploited both in and out of the classroom. (Coursey, 2011). The Smartpen enables lesson material to be presented in a multimedia format that combines elements of sketching, writing, and audio recording, engaging a range of sense at once and reaching students with different learning styles effectively (Coursey, 2011). It has benefits for the teacher and student alike.

Teachers:
The Smartpen can be used by teachers in multiple ways, from lectures and problem solving, through to cue cards and music notes. In whatever manner it is used, these techniques make it easier for teachers to deliver information in multiple formats in class, so as to engage multiple senses and to reach students across the spectrum of learning styles (Coursey, 2011).

Students:
The use of the Smartpen adheres to constructivist theory which suggests students learn best when actively engaged with content, when communicating and when collaborating to create new information (Hannon, 2008). In a review of American university students using the Smartpen, Williams, Johnson & Bouck (2010) found that the students engaged with the technology for note taking and review strategies and found the Smartpen assisted their study. This is supported by the work of Coursey (2011) who found that the use of the Smartpen with students 'at risk' had successful implications. Students with English as second langue (ESL) were able to replay recorded lesson multiple times, at a slower speed and work at their own pace. Further to this Coursey (2011) highlights the value of the Smartpen as a multisensory engagement tool for students with learning disabilities and special needs. It is suggested that the Smartpen can be customised to the learning needs of the individual. An example includes dyslexic or blind students using the pen's audio capability to hear information they would find difficult or impossible to process in a visual medium.

YELLOW HAT

de Bono (1995) asserts that whilst wearing the yellow hat we make an effort to find the values and benefits in a suggestion: *what is good about this? where are the benefits? who is going to benefit?*

The yellow hat represents the optimism of the sun and recognises the value. Thinking is constructive and productive.

NEGATIVES

WHAT AR THE IMPLICATIONS THAT NEED CAREFUL CONSIDERATION?

Black Hat

When one wears the black hat, they must at the scenario cautiously and defensively. Try to see why it might not work. This is important because it highlights the weak points in a plan. It allows the weaknesses to be eliminated or altered (De Bono , 1995).

Hannon (2008) notes that the Smartpen is not the first recording or sharing device to turn up in the classroom, with audio recorders and laptops being present for close to a decade. He argues that such technologies can lead to students becoming more apathetic about their education. Hannon (2008) also points to the ownership of intellectual property as a concern with the Smartpen. Further to this one must consider the cost to educational institutions or individuals in purchasing and maintaining the Smartpen.

1. Student Learning– Will they switch off?

Hannon (2008) argues that the Smartpen should encourage students to engage with the discussion, knowing they can replay the experience afterward. Triggering the debate that the material presented in the classroom must engage the learner to ensure they do not become passive about their learning.

Insight

One must consider what policies and procedures they use to implement technologies including the Smartpen. They need to ensure they are used to the benefit of students.

2. **Intellectual property– Who owns the rights to the notes and audio?**

According to Hannon (2008) some legal ambiguity still persists over whether schools or colleges own the intellectual property produced in and for the classroom. He suggests that policies be written to protect the intellectual property interests of schools and colleges.

3. Cost– Can we afford this investment? Put simply each pen is worth $89. Can institutions afford to buy these for students? Can they maintain the costs of ink, paper and repairs? These are all questions that need to be addressed at each school. Hannon (2008) suggest that schools implement trials with those students 'at risk' to determine how cost effective such a program would be.

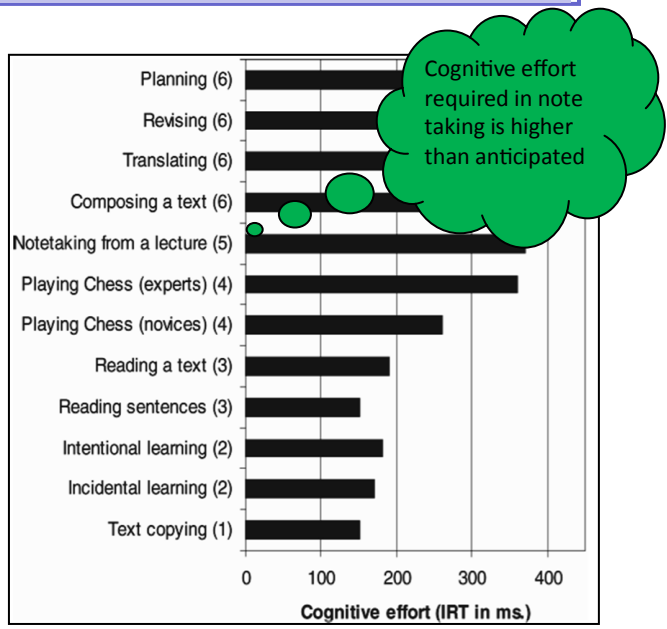
CREATIVITY AND APPLICATION

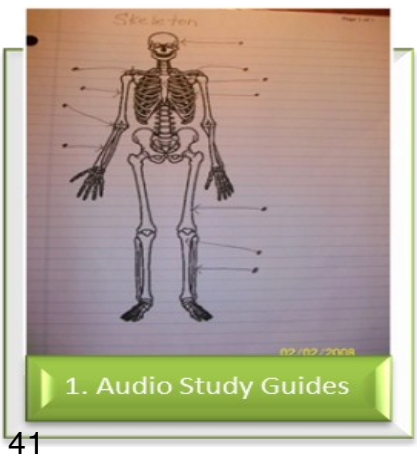
WHERE TEACHERS CAN USE THE SMART PEN

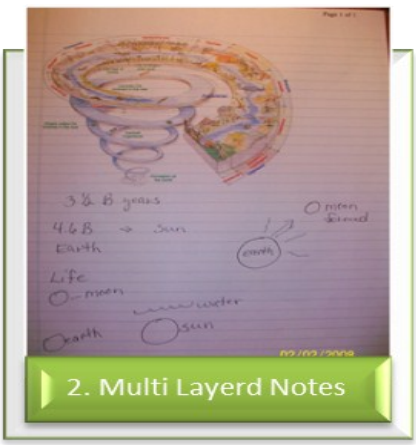
Green Hat

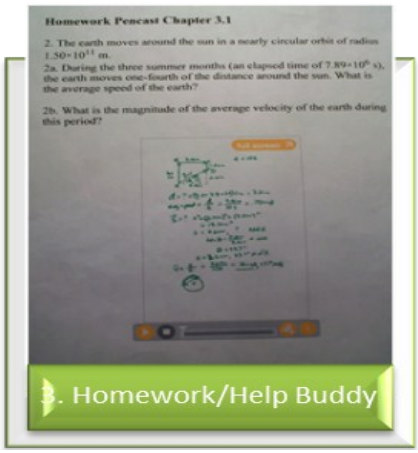
de Bono (1995) compares the green hat to vegetation, which suggests growth, energy and life. The green hat is the energy hat. Under the green hat you put forward proposals and suggestions. It is all about new ideas.

The ways in which teachers and students can engage with the Smartpen are endless. It is noted that the Smartpen can be used for assignment, mentoring new teachers, staff meetings and distance education (Livescribe Inc., 2007). With so many possibilities, the three contexts shown below with be explored here. The most common way it is being used in the classroom is for note taking (2). As seen to the right Piolat, Olive & Kellogg (2005), have identified note taking higher than chess and reading, in relation to cognitive effort. Therefore, multilayered note taking which allows the student to write information that they can go back and listen to, is a powerful cognitive learning tool. Further to this, teachers are using the Smartpen to create audio study guides (1). Student can record both written and audio notes and these can then be viewed by the class. Imagine a class designing a set of audio books on the human body. Lastly, the Smartpen is also being used for homework or at home help (3) , an aspect that I have witnessed to be effective. Within my year 10 class, I loaded a few of my Pencasts onto moodle as part of exam revision. Students then followed the instructions to complete the revision exam and were able to stop, pause and replay the lessons as it was in progress. Consequently, allowing them to engage with the learning process at their own pace. Katz (2005) urges science and mathematics teachers to tap into the rich potential of the Smartpen in teaching complex equations and formulas. Now, the challenge rests with the educators.









CONCLUSION

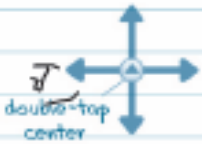
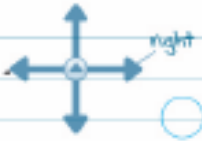
De Bono's six thinking hats have provided a logical framework through which to explore the Smartpen. This reflection has shown the methods of learning, the implications of new knowledge and the possible uses for this knowledge. It was seen that learning the 'how' involved different inputs from tutorials and online resources. It would be assumed that teachers and students alike would learn in similar ways. The potential of the Smartpen to have a beneficial impact within the classroom is enormous. However, it needs concise policies and procedures for effective implementation. I have found this tool and learning experience to be valuable and I will continue to use the Smartpen in my teaching. Further to this I can see many applications for the de Bono six thinking hats in the classroom, it was an effective tool for thinking and problem solving.

APPENDIX ONE

TUTORIAL

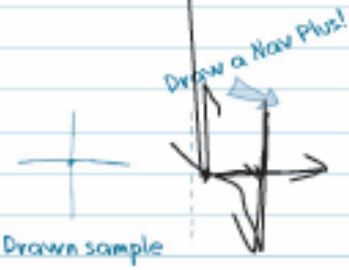
The Nav Plus Navigation Basics

The Nav Plus is a 5-way controller that moves you through the Pulse menu. You can use any printed Nav Plus or draw your own. Make sure your smartpen is ON and follow the steps below.

Step:	Function:	
1. Double-tap center (tap twice quickly in the same spot)	Try it now. This takes you to the Main Menu on your display.	
2. Tap up/Tap down (tap at the ends of the arms)	Scrolls up or down in the Menu.	
3. Tap right	Launches the displayed application.	
4. Tap left	Moves one step back in the Menu until you've reached the Main Menu. Also may exit an application.	

Advanced:

5. Draw a Nav Plus:
   a. Draw intersecting vertical and horizontal lines.
   b. Promptly double-tap in the center.
   Now, this Nav Plus is always ready!
   (Hint: Keep it about the size of the drawn sample.)



Drawn sample

Tip: Applications such as Paper Replay may contain their own menus, folders, files, and commands. Refer to the User Manual located on your Pulse Software Installation CD for more info.

6. Head back to the Getting Started Guide and install the Livescribe Desktop software!

Nav Plus

APPENDIX TWO

PENCASTS

Zinc + hydrochloric → Zinc chloride + hyd

$Zn + 2HCl \rightarrow ZnCl_2 + H_2$

Zn = 1
H = 1
Cl = 1

Zn = 1
Cl = 2
H = 2

Lithium carbonate + hydrochloric acid

Lithium chloride + water + carbon dioxide

$LiCO_3 + HCl \rightarrow LiCl + H_2O + CO_2$

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